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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/982,454	10/17/2001	Kiyoshi Satoh	ASMJP.100AUS	7409

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EXAMINER

CROWELL, ANNA M

ART UNIT

PAPER NUMBER

1763

DATE MAILED: 07/31/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/982,454

Applicant(s)

SATOH ET AL.

Examiner

Michelle Crowell

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 30 June 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-5, 7 and 9-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7, 9-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

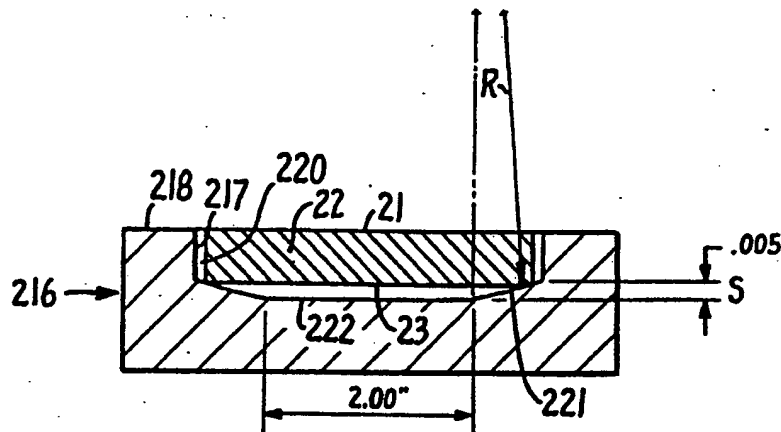


FIG. 4.

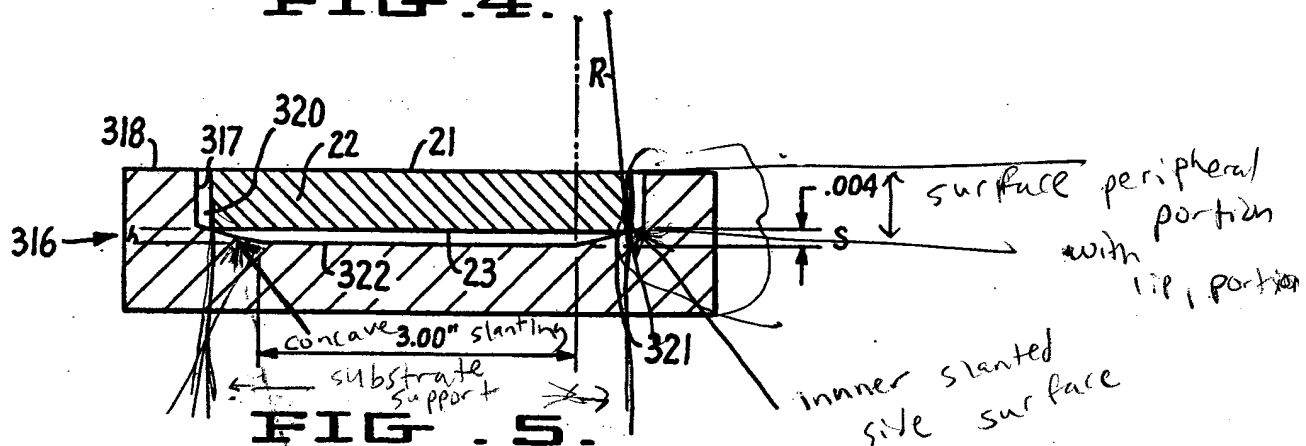


FIG. 5.

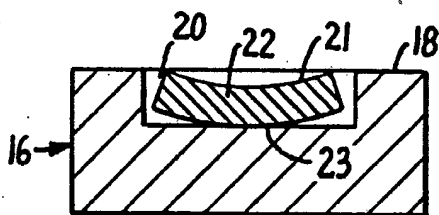


FIG. 6.

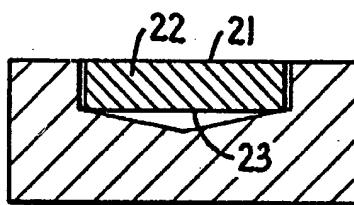


FIG. 7.

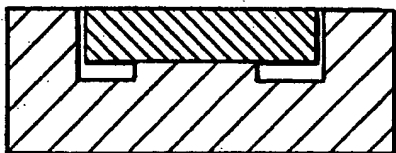


FIG. 8.

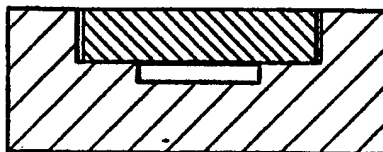


FIG. 9.

**DETAILED ACTION**

***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on June 30, 2003 has been entered.

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-5, 7, 9-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aruga et al. (U.S. 5,688,331) in view of McDiarmid (U.S. 5,242,501).

Referring to Figures 2 and 6, and column 5, lines 21-37, 56-67, and column 6, lines 1-29, Aruga discloses a plasma CVD apparatus comprising a substrate supporting surface 39 for supporting the substrate 35, an RF metallic electrode plate 41 (radio frequency electrode), and a heater 43. Both the electrode plate 41 and the heater 43 are embedded in the substrate supporting surface 39. In addition, the electrode plate 41 is embedded above the heating element. The substrate 35 is held on the susceptor 39 without using a mechanical mechanism.

Aruga fails to teach a substrate-supporting surface having a concave portion and a surface peripheral portion

Referring to Figures 3-5 and 7, column 4, lines 6-35, 45-58, and column 5, lines 1-11, McDiarmid teaches a susceptor 16, 116, 216, 316 (substrate-supporting surface) having a concave portion. The surface 18, 118, 218, 318 (surface peripheral portion) includes a lip portion having a top surface and a slanted inner side surface. Furthermore, the surface 118, 118, 218, 318 is the same height as the wafer 22. In addition, the inner slanted side surface is slanted outward at an angle greater than the substrate-supporting surface and facing an outer edge surface of the substrate when loaded (See attached Fig. 5).

McDiarmid teaches various designs for the concave portion of the susceptor 16. Figure 3 shows that the susceptor 116 has a spherically shaped bottom surface 119. Figure 7 illustrates that the susceptor 16 has a conically shaped bottom surface. Figures 4 and 5 display that the concave portion of the susceptors 216 and 316 has a slanting portion 221, 321 and a flat portion 222, 322. By varying the design of the susceptor's concave portion, uniform heating across the wafer is achieved.

Aruga fails to teach a distance between the substrate and the concave portion.

Referring to Table A and B, and column 5, lines 50-68, and column 6, lines 1-50, McDiarmid teaches that the distance  $S, h$  between the back surface of the wafer 22 and the center of the concave portion can be 0.00055 – 0.007 inches (within 0.05 mm to 0.3 mm). The optimum distance  $S, h$  is determined in order to provide uniform heating to the wafer 22 and minimize slip.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to design the susceptor of Aruga with the concave portion as taught by McDiarmid. This would provide uniform heating to the substrate, hence preventing deformation of the substrate.

***Response to Arguments***

**Applicant has argued that McDiarmid's lip portion is not slanted but exactly vertical.**  
However, as seen in attached Figure 5, part of the lip portion is slanted.

**Applicant has argued that the slanting portion 221, 321 is part of the wafer-supporting surface.**  
As seen in attached Figure 5, part of the slanting portion 221,321 is a wafer supporting surface and part is a lip portion

**Applicant has argued that McDiarmid's apparatus is a thermal CVD apparatus and there is no suggestion to apply this configuration to a plasma CVD apparatus (for plasma converging problem.**  
The suggestion is to provide uniform heating to the substrate, hence preventing deformation of the substrate. Furthermore, the substrate support is capable of being provided in a plasma processing apparatus.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michelle Crowell whose telephone number is (703) 305-1956. The examiner can normally be reached on M-F (8:00 - 4:30).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on (703) 308-1633. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

AMC *me*  
July 28, 2003

*Luz Alejandro Mulero*  
**LUZ ALEJANDRO-MULERO**  
**PRIMARY EXAMINER**